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INITIAL OPERATIONAL SUPPORT: AN ALTERNATE APPROACH.(U)

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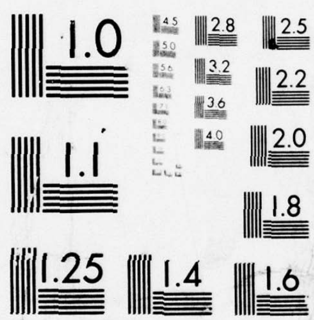

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INITIAL OPERATIONAL SUPPORT:
AN ALTERNATE APPROACH

STUDY PROJECT REPORT
PMC 77-1

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INITIAL OPERATIONAL SUPPORT:
AN ALTERNATE APPROACH

Individual Study Program

Study Project Report

Prepared as a Formal Report

Defense Systems Management College

Program Management Course

Class 77-1

by

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Study Project Advisor
Wayne Schmidt

This study project report represents the views, conclusions and recommendations of the author and does not necessarily reflect the official opinion of the Defense Systems Management College or the Department of Defense.

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DEFENSE SYSTEMS MANAGEMENT COLLEGE

STUDY TITLE: INITIAL OPERATIONAL SUPPORT: AN ALTERNATE APPROACH

STUDY PROJECT GOALS:

1. Provide an objective evaluation of the organization and means best suited to providing that support.

2. Provide recommendations for improving system performance.

STUDY REPORT ABSTRACT:

The purpose of the project was to provide a rationale for re-evaluating the manner in which weapon systems are introduced into the operational inventory. An alternate approach to this is then proposed. The suggested alternative was based on the author's experience in fielding three systems in two separate programs from a position within the acquisition organization. Facts, assumption, and conclusions necessary to support the proposed alternative are documented by reference to separate, independent research sources. The resulting approach is an amalgam from the programs worked directly by the author and the experience of associates in similar endeavors.

Descriptors
- Program Management
- Reliability, Availability, Maintainability
- Procurement
- Logistics Management
- Ownership costs
- Maintenance Support
- Logistics Assistance
- Logistics Support
- Integrated Maintenance Management
- Aircraft Maintenance

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Executive Summary

This examination of the weapon system acquisition process is focused on the means of improving field reliability in a cost-effective manner. Imposing more stringent reliability requirements on the contractor frequently results in an improvement on paper that is not readily discernible in the field. Extended testing reveals additional system discrepancies and yields a value of reliability that shows a higher correlation with field results. This still, however, results in a perceived field reliability that is only a small fraction of the demonstrated value. Peculiarities in supply procedures and maintenance practices serve to obscure actual problems so that considerable effort is expended in working on symptoms rather than actual problems.

An alternate approach proposed to resolve some of these problems suggests it would be more cost-effective to apply extensive management attention to the initial deployment phase. Using the operational environment as the final arena for evaluation, identifying problems at the earliest possible point in this environment, and instituting policies and practices that result in the expeditious incorporation of corrective action is the central theme of this approach. The use of interim contractor support in areas of contractual deficiency or service induced support problems is an integral part of the proposed solution. A project office in acquisition organization is proposed to integrate the overall effort. The scope of the

effort would be limited by restricting the total time frame and specifying the point at which the effort is to be initiated.

ACKNOWLEDGEMENTS

I wish to thank Colonel Dameron Spruill, F-15 System Program office, for the support provided during the time these thoughts were being organized. And a special thanks to Mr. Garrett La Rose and Lieutenant Colonel George Hennigan for the insight they provided in personal interviews.

SECTION I

INTRODUCTION

Weapon system acquisition is big business. The annual defense budget for Research and Development, and Procurement is in the region of $30 billion and, in constant dollar terms, has been roughly constant since 1964. (4:27)[1] This acquisition process is a complex and expensive undertaking in which there are a multitude of alternatives. The overall goal is to achieve a suitable system at a price that is affordable. Specific areas for improvement (in effectiveness, cost, safety, etc.) have been identified and disciplines established to insure their thorough consideration. Management and management policies, practices, and tools have been examined in depth in an attempt to improve the effectiveness of the process.

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[1]This notation will be used throughout the report for sources of quotations and major references. The first number is the source listed in the bibliography. The second number is the page in the reference.

PURPOSE

This paper will look at the initial deployment of the weapon system from the acquisition standpoint. The initial deployment phase is characteristically entered with a great deal of anxious anticipation because of the uncertainity of operational effectiveness, suitability, and supportability. Considerable concern is evidenced over the differences between the cost related performance parameter values demonstrated by the contractor and service acquisition organization and the values achieved by the user under field conditions. (6:42) Increased hardware reliability and extended testing are often proposed as solutions while the logistics system is blamed for failure to have the required parts available. (11:1) Each of these will be briefly examined, environmental factors affecting perception of performance outlined, and a means of achieving the desired outcome then outlined.

RELIABILITY

Life cycle cost is a subject highlighted for concern in recent Department of Defense directives with a considerable emphasis on the costs of ownership. It is this emphasis on the cost of ownership that currently draws attention to reliability..

Much of the criticism is the result of reliability data provided by, or derived from, figures supplied by the operational organizations using the equipment. These figures rarely support the claims of the contractor, the values demonstrated to comply with specifications, or the estimates of the procuring organization. In further support of the detracting arguments are the man-hours expended in maintaining these systems. The lower reliability generates more frequent equipment removal, repair, and replacement with the attendant increase in manpower requirements at all maintenance levels. (7:14) This issue in itself, is significant because of the growing concern with personnel costs, aside from the emphasis on life cycle costs.

A first and necessary step to improving equipment performance in the field is an actual determination of where we are now. Policies and practices that mask actual equipment performance must be identified, examined, and accomodated. This has been recognized by O.C. Boileau, president, Boeing Aircraft Co.,

> "....We ran design to cost and contractor studies on replacing 20 year old B-52 aircraft with brand new B-52's. By following the prevailing operations and main-

tenance procedures, we were able to identify only a two percent reduction in life cycle costs. On the other hand a manage to cost study of B-52 Air Force wing organizations indicated that as much as 30 percent could be saved by revising the concepts of life cycle military services - contractor support." (1:7)

In complex systems with multi-mode functioning, field reported reliability is determined by factors other than equipment reliability. The maintenance action frequency (number of maintenance actions per unit of operating time) becomes the major component in computing "reliability" and thus "reliability" may appear independent of equipment reliability. Results obtained by G. A. Kern found that improving equipment reliability by a factor of 10 would only increase reported reliability by a factor of 2. (9:208) To address reliability without consideration of actual field practices and policies is to invite failure.

Dr. Currie addressed this area when he called for " . . . increased emphasis on fielding weapons--that is, a successful transition from R & D to production and deployment" and then continued "R & D is not an end in itself; what counts is superior equipment in the hands of our armed forces . . . The following are areas in which I have serious concerns: Our operating and support costs are too high--this will be a focus of continuing R & D attention." (2:1-10)

If the reported reliability is a function of maintenance and operations practices and procedures rather than hardware reliability, the acquisition organization has the opportunity to expend an effort in this area to reduce life cycle costs for

the system. It should address those areas where it is possible to achieve improvements in "reliability" more cheaply by changing maintenance and operations practices than by further expenditure of Research and Development resources. Procurement gains would then be realized by foregoing more stringent manufacturing practices to obtain the higher equipment reliabilities. Operations and support costs should be reduced by less frequent maintenance and therefore, spares could be procured in reduced quantities just as if equipment reliability had been improved. The extent to which resources are applied to this task could influence, to a significant degree, the expenditures for Research, Development, Test, and Evaluation (RDT&E); procurement; and operations and support costs.

TESTING

The extension of testing is often proposed as a means of improving ultimate field reliability. Models are available that show a continued increase in reliability growth in a test program and that the rate of growth is a function of the aggressiveness of the reliability improvement program. (14:38)

While it is possible that greatly expanding test programs over current practice would result in a more accurate estimate of system reliability and maintainability, that estimate is predicated upon a fully knowledgeable user operating a mature system. (11:4ff) In other words, errors on the part of the user are not considered. Thus it is also highly probable that additional problems in this area would still occur when the system was handed over to the ultimate real world user. The reordering of test programs and the priorities in those programs would be a major undertaking in itself. Test programs have specific goals and do not accumulate the hours under the operational conditions of the user except for specific test programs in the operational phase such as the "lead the fleet" programs. The cost and time to achieve the goals under operational conditions would be enormous. (11:12) The benefit may be much less. Leaving the testing for specific goals in one phase and accumulating additional operating time in another would alleviate the situation somewhat but result in conditions much like those in existence today. Personnel from the using command would have to be responsible for the maintenance if the results

were to be truly representative. Extending the list of required changes evolves into a circular path that leads back to proximate current practices.

An analysis of reliability results on the A-7D found:

"It appears that the results from flight testing give a fairly good indication of what could be expected in operational use. It is also evident that the situation is not improving with operational experience, which is contrary to the assumption today that things will "mature" with use in the field. Item reliability will not improve unless specific steps are taken to fix problems encountered in testing." (11:13)

In this case the operational experience was actually less than five percent of contracted mil spec values on certain equipments but the testing had indicated results would be in this range. The results were not a one-to-one relationship, however, for in both phases there were problems in one phase that were not significant in the other. Nevertheless, no amount of testing can predict the situation in the initial deployment phase. (14:74) The environment is thus different, and additional testing will not resolve the problem. The only answer is to deploy carefully.

SECTION II

ENVIRONMENTAL AND SUPPORT FACTORS

SUPPLY SUPPORT

Support planning is not a neglected area in the acquisition of weapon systems. It is initiated very early in the life cycle and continues throughout the life of the system. The earliest proscription of design considers the maintenance concept to be imposed on the system. Supply support and the other logistics elements are increasingly taken into account as the design progresses.

Policy dictates the early philosophy for procuring spares to support the weapon system. There must be struck a balance between full, immediate support for all requirements and the tempered position of cost-effective support that does not waste resources on early equipment configurations that become obsolete through engineering changes. There are several means of accomplishing this. The weighted procurement of spares as a percentage of delivered systems strikes a reasonable balance so long as equipment reliability falls near expected values (those arrived at by applying experience factors to achieve "spared MTBF"). Pro-rata procurement assures that obsolescence is limited to spares acquired prior to the point a new configuration is "cut into" system production. Additional security is available if the spares contract provides for early contractor deliveries upon request of the system manager. Nevertheless, there will be a shortage of assets if the deficiency in expected

reliability is significant.

The small quantities of systems in the hands of the user during the early portion of the program magnify the impact of any support deficiency. The random distribution of failures may result in a grouping that will result in a significant percentage of the force being in a non-operationally ready status. This is the "batch failure" phenomena identified by Hedburg. (7:14) A greater number of systems would ameliorate the condition by dilution, lateral support, and a larger pool of available spares.

SITE ACTIVATION TASK FORCE (SATAF)

The introduction of the first production unit to the field is not a good time to turn complete support over to the Air Force Logistics Command. The organic service engineering organization has not developed a corporate memory, it is unfamiliar with the design (both intent and inherent characteristics), and problem identification is seriously delayed by the reporting system. The impact of failures, in percentage terms, has a far greater significance when the number of units is small (with only the first delivery, any failure will result in a 100% not-operationally ready condition for the "force").

The specific support task is initially undertaken by the Site Activation Task Force (SATAF). Their objective is to assure that all of the listed required support elements are actually available on schedule:

Support Equipment
Training Equipment
Facilities
Personnel
Spares
Training
Technical Publications

The intensive integration task for the introduction of the system to a specific site is assumed by the Site Activation Task Force (SATAF) one to two years prior to arrival of the first unit. The first task is normally a physical facilities review to determine the adequacy of facilities and their scheduled completion. Problem areas are identified, working groups established,

and action items assigned for problem and contingency resolution. (16:3-5,6)

USER

The maintenance organization is concerned with achieving the projected availability requirements with their alloted resources of personnel, time and equipment/facilities. (7:13) Maintenance policies and practices support this objective. They are strictly within the user's purview and determined by the operational imperatives for operationally ready equipment. Troubleshooting equipment that is "not defective" is not only wasteful in manpower expenditures, it runs the real risk of inducing failures. (7:14) One direct cause for this activity is an incorrect perception of equipment capabilities by the operator. (11:12) This perception can arise from incorrect technical data, inadequate/improper training, or excessive demands on the operator at the time of the observation. Technical data inadequacies in this category might be the failure to correlate detect/lock-on/track ranges with target size in an airborne radar system. Training may have failed to bring out the equipment limitations during the type of maneuver being performed with the resultant attempt at operation outside design limits. The complexity of the situation may prevent the operator from recognizing the cause of equipment failure to operate as expected. (7:214) This latter case can be detected only by a skilled person in a post-mission debriefing. (11:3) Operational requirements are generally intolerant of successive mission failures for the same equipment failure. In turn, and as a result of that intolerance, maintenance policies are generally

intolerant of any practice that could lead to that result. At the lower levels of maintenance this can lead to sequential replacement of system components. This trial and error maintenance results in false failure reporting. For example, if a system contains six black boxes, and one of them is faulty, trial and error procedures could result in all six being replaced. The faulty one is charged with a failure, but so are the five good ones. (7:214) In the vein, a "can-not-duplicate" followed by a repeat discrepancy for the same or a very similar problem generates suspicion of inadequate troubleshooting. Thie result is sometimes avoided by a "best guess" replacement again with the attendant possibility of false reporting.

Logistic support of the maintenance effort is a critical element in the achievement equation. This fact is quite apparent but it deserves additional consideration from the standpoint of data collection and motivation in the initial deployment phase. If adequate spare parts are available, many deficiencies in personnel, training, and support equipment can be resolved by replacement action. Troubleshooting can become a trial and error activity that overcomes technical data or test equipment deficiencies.

During the very early deployment phase some availability degradation can be rationalized in a number of ways and is, in fact, expected. If during this time, the reliability of the equipment, test equipment fault detection/isolation capability, and transportation/pipeline time can be shown to be deficient,

additional quantities of spares may be procured to support the system. These additional quantities will provide the capability for support in less than the normal time frame under normal conditions and therefore provide the maintenance manager with increased latitude in the use of resources. There is very little incentive then for insuring data accuracy--it need only reflect an equipment reliability or maintenance effort that is no better than actual. The maintenance manager and the user in fact are benefited by the overprocurement of spares.

SECTION III

START-UP

One of the problems in the initial deployment of a weapon system is the transience of the situation and the different expectations of the observing groups. The perceptions of each of these groups is biased by their expectations and their extrapolation of the observed results to the anticipated stable operating condition. As a general principle, data gathered during conditions of instability does not reflect the stable condition, and therefore cannot be used to make, or be interpreted to provide, definitive statements on the final operating conditions. (3:9) An analogy to illustrate this may be found in the start-up of a large chemical processing plant (or an oil refinery). Here the integration of a large number of processes coupled with the inputs of a variety of materials being supplied by transfer lines operating over a wide range of capacity at degrees of availability that may range from initially empty to one hundred percent is complicated by pressures and temperatures that must be controlled to accomodate rate or volume changes far outside normal operating conditions. This period of operation is controlled by specialists from the engineering discipline and not by operating personnel. It is not until tests have been completed and the process has settled down into the expected range of operation that it is turned over to operating personnel and automatic controls.

From an acquisition standpoint, there is no validity to operational (maintenance) data derived from support when the required elements are not available, i.e. operational readiness (availability) when the projected spares levels are not laid-in, when the avionics intermediate shop facility is not configured to permit operation of automatic test equipment, or maintenance trainers are not available so that on-the-job training is occurring in the actual maintenance process.

The contractor cannot be held responsible for support practices that are not aligned with design/development intent and the acquiring organization is unable to establish the equipment performance for evaluation. Both parties have a high level of interest in the manner in which the equipment is used. If the environment is more severe than anticipated, redesign may be called for unless it is possible to alter the environment. The available data systems for user operational data--daily, weekly, and monthly summaries; user maintenance data--daily, weekly, and monthly summaries plus special reports on significant items; and supply system data--monthly, quarterly, and annual summaries, deficiency reporting systems; are useful in providing feedback but these systems were designed for use with systems operating in a stable condition and they cannot be used to predict final conditions. (13:263) Further, they require a great deal of interpretation to provide useful information when used for feedback.

SECTION IV

A SUPPORT ALTERNATIVE

The current method of operational support is incapable of discriminating among the factors affecting reliability to isolate true equipment reliability. Since equipment improvements affect only equipment reliability, improving equipment reliability may be of little effect if the problem lies in procedures and misinformation among the users. (8:214)

An alternative means of support during the early operational phase may be able to identify some of the factors that affect perceived reliability; and it may be able to alter them sufficiently to effect a real decrease in support costs with the ancillary benefit of reporting a more nearly accurate reliability.

Since the best efforts of a large, capable acquisition team (the program office, contractor, plant representative's office, logistics function, test organization) have been engaged for an extended time and are represented by the aggregate system being fielded, some further effort is warranted to see that field practices embody the employment intent of that team. There will almost certainly be errors that escape detection until the final user gets the system. (12:24) These errors should be addressed, when detected, with the same vigor that accompanied the original efforts. These two tasks, then, are the ones that should be addressed by a dedicated organizational element with the same focus as the Site Activation Task Force. The actual magnitude of this effort will represent a very small

addition to the total program and has the potential for significant gains in the overall cost-effectiveness.

GENERAL

In examining the problem it appears that there is a need to reexamine the outcome that is to be achieved: identify problems in the system at a point in the program where corrective action will result in a reduction of the cost of acquisition and ownership. It is also desirable to provide the user an operational capability with the system at the earliest date. The problem is an obvious balancing between production and retrofit, testing, and operational availability. Most approaches to improvement of reliability and availability stress an aggressive program requirement if any significant gains are to be achieved. This same stress can be applied at different points in the program to provide alternative solutions.

Most development and acquisition programs start a phase down of technical personnel concurrently with the initiation of production deliveries. The alternative proposed here is to intensify the program at this point, to initiate an aggressive pursuit and resolution of problems as they are unveiled in actual operational usage, and to materially accelerate production incorporation of the "fix." The approach is direct, simple, straight-forward. It involves no new concepts or techniques and embodies the precepts of current management practices. The manner of implementation, though, is crucial to the success of the program. The planning and preparation should be as detailed and thorough as that applied to any significant development program. Rapid communication is essential; the information

should flow in parallel paths. And, the process must be controlled; no new capabilities are to be added; the thrust must be to achieve optimal utilization of the inherent capabilities within the original design intent.

The approach described here must be fully supported by both the military program manager and the contractor program manager. The essence of the program is the ability, or capacity, and the willingness to expedite the incorporation of the required changes into the production program. The time frame for this activity will be limited so that is is not the same as the continuous string of changes that drive costs upward unendingly. It is more closely aligned with a prototype or pre-production program in which the user is acting as a test agency. (This is essentially the approach recommended by Secretary of Defense Packard in the Defense Management Journal, July 1972, "Improving R & D Management Through Prototyping") The component and subsystem testing will have been previously completed as will the operational testing that is normally accomplished prior to production initiation. This is the "Start-up" phase of the program.

INTERIM CONTRACTOR SUPPORT

Actions taken to hold down costs involve extensive use of contractor resources and capabilities. There need be no change in the normal practice of establishing target dates for the availability of support equipment deliveries. Arrangements at the outset should make it clear, however, that any contractual deficiencies in equipment capability or delivery will be made up by the application of contractor resources and considered a contract deficiency reimbursable at cost.

Contractor production capacity will be established at a level that will permit the supply of required spares from production stock as well as providing turn around assets for modification programs made necessary by implemented changes. This will alleviate a part of the spares problem since deliveries will be made from production stock on an as-required basis. The use of this means of supply will be limited to system peculiar items. Configuration of delivered items will correspond to the latest configuration approved for delivery. The contractor will be responsible for updating all assets delivered to the final production configuration and for maintaining configuration control and tracking as well as consumption data for "start-up."

Agreements with the Air Force Logistics Command (AFLC) would determine the precise procedures to be followed but the contractor would be responsible for maintaining cognizance of parts requirements and insuring the availability of major or

peculiar items. Actual issuing/shipping would be done after coordination with AFLC but would be based on the contractor's determination of a requirement subject to the system manager's (AFLC/Air Logistics Center) revision. The intent in the procedure is to avoid the delays that occur in relaying the request through formal channels to the system manager and then to the contractor. Once the requirement is determined valid and no suitable alternative to supply found reasonably available, the contractor would be authorized to ship, i.e., a radar processor requisition would not have to be processed through formal channels before shipping in the case where the contractor had all off-base, uninstalled assets because of a previous determination of deficiencies in support equipment. While this example used a major equipment it should be noted that the same procedures apply for "bits and pieces" peculiar to the system. This procedure would entail the establishment of a supply monitoring system by the contractor. It would be a reasonable assumption, however, that the personnel assigned to this function would have been accomplishing it anyway and therefore, would require only a formal assignment to that task, rather than the assignment of additional personnel.

Contractor personnel will be considered a prime resource for the make up on any deficiencies in technical data or fault isolation (trouble shooting) in this approach. Areas with known deficiencies will have contractor personnel with both theoretical and practical knowledge/capabilities assigned to the

using organization for immediate assistance on an "as required" basis. These personnel would be in the maintenance complex and utilized at the discretion of the chief of maintenance.

Additional contractor personnel would be assigned to insure coverage of all major system areas. The number of personnel would be determined by the work-load and adjusted as needed. The basic assignment would be for the entire one year (or other specified time span) start-up phase. Other duties for these personnel would involve the continuous monitoring of equipment status and performance for early identification of technical or design problems. They would also form the originating basis for data collection/analysis in the feedback loop. Inputs would originate from both organic maintenance activity recording and personal observation. (15:253)

COSTS

Contractor costs in this phase can be more closely examined by dividing them into three categories:

1. Those related to the providing of spares support,

2. Those related to providing maintenance support in deficient areas, and

3. Those related to improving the "operational reliability" of the system.

Those costs related to spares can be compared to historical costs for other similar systems, to include costs for engineering change retrofit and obsolescence caused by configuration changes or no/low demand. This comparison would establish the range of potential benefits for a particular system type.

The costs of maintenance support can be related to alternate means of supporting the system. These might include the use of automatic test equipment that was not completely developed, manual test equipment adapted for use with the necessary subsystems, or a remove and replace concept for the affected equipment.

"Improvement" costs can be compared to life--cycle operations and maintenance (O & M) costs. A Rand study on the A-7D aircraft provides the data for an example for fighter type aircraft. (12:9) Life-cycle base-level O & M costs, discounted at five percent over a fifteen year life, account for 48 % of the $6.8 million life-cycle cost per aircraft. For a force size of 200 aircraft, a one percent reduction in base-level O & M costs would result in a discounted cost savings of $6.5 million. This

would equate to approximately $4.0 million per year for an eighteen month program for each anticipated one percent reduction in base-level O & M costs.

Combining the three elements would provide an upper limit to be allocated to contractor support for the tasks outlined. The program would require the close cooperation between the contractor and the service to be cost effective. This calls for the application of extensive management attention with the acquisition, user, and support organizations. Every effort must be made to integrate the activities of the concerned organizations into a team effort.

SERVICE SUPPORT

Service support of this concept would require a dedicated group to oversee and facilitate the operation. Many logistics and maintenance problems require an in-depth study to determine the true (root) cause. Superficial causes for non-availability of assets, such as poor reliability, must be closely examined. Fault diagnosis/isolation, test equipment design and programming, technical data instructions, improper linking of parts (in the supply system), failure to consider consumables, transportation misrouting, improper designation, lack of proper ordering information, induced secondary failures, and improper repair may all be causes of the lack of asset availability. Engineering/design problems are the unquestioned responsibility of the system program office (SPO) but reported inadequacies require definition before corrective effort is expended. The environment and requirements at the time of reported failure must be examined closely. Was the task placed on the equipment within its design requirements? This question is particularly appropriate for some reported operational failures for, in many cases, the equipment is being expected to perform tasks outside its design requirement although it is not readily apparent to either the operator or maintenance personnel, i.e. radar gimbal limits, rate group overload in a computer routine, inertial navigation system updating. This type of a problem population requires a keen discernment of issues if the proposed alternative is to work. Problems must be sorted into at least three basic groups:

engineering, logistic, and other. The design relatable (and correctable) engineering problems need to be evaluated for scope. The processes for developing, proving, implementing, and controlling the changes must be considered in developing a realistic time frame for resolution. Logistics problems that arise from maintenance induced failures of equipment must be investigated for procedural inadequacies caused by poor equipment design, technical data inaccuracies or deficiencies, and training deficiencies. These are areas that can generally be altered by the acquisition and logistics organizations. Other maintenance induced problems are the primary concern of the using organization and appropriately left to it to resolve. Immediate attention is required to those significant problems deemed to be within the SPO's realm of responsibility. The problems must be fed directly into a system that can generate the requisite corrective action.

Communication is vitally important to an approach employing a high degree of mobility. This communication is enhanced by personal contact with individuals in each of the associated agencies. It must be further supported by rapid electrical transmission capability, as the essence of the approach is timely response. While time consuming, if conducted on an extended, large scale, the most effective means of editing data for trends is to have individuals on the tiger team conduct a daily review of the previous day's activity. A short summary of this data and system component status should be provided to appropriate groups each day for their review of significant

events within their particular area of speciality. This review can be conveniently presented to the program director at the morning staff meeting in less than five minutes for a complete routine review.

The key to the interim support for the aircraft general system, to include avionics and fire control sub-systems, is flexibility. The tiger team approach must be fully supported with the authority and responsibility to cross organizational boundaries in the Program Office, user activities, and contractor facility as suggested in AFSCP 800-3.

The organizational structure best suited to accomplish the identification, sorting, and initiation of corrective action is one composed of knowledgeable individuals drawn from the group responsible for design and production. This group is familiar with the types of problems encountered and accustomed to dealing with them. The inherent flexibility in a problem solving organization committed to thorough study but quick reaction is a necessity. At this early point in a program, attempting to accumulate, through formal channels, a statistical base sufficient to justify action will ensure a late, costly response--just what the approach is trying to avoid. The inherent time lag between problem occurance and resolution needs to be reduced to a minimum.

The field support function would logically be performed within the system program office and staffed with personnel from its resources. The function should have a project orientation

itself because of the number of action and coordination interfaces necessary to fulfill its objectives.

An essential part of this concept and a fundament of the field support function is the use of a field liaison officer. This individual is drawn from the field support function in the SPO and is physically located at the user facility in close proximity to the chief of maintenance. He functions in coordination with the weapon system liaison officer from the prime Air Logistics Center (ALC). The liaison officer must establish a close rapport with the chief of maintenance and the personnel within the maintenance complex. He must have access to the information conveying or concerning problems, to the work areas, supply areas, and the control area. Knowledge of maintenance and supply practices and procedures is essential, as is a thorough familiarity with both the contractor and SPO organizations. There must be a definite awareness of the command structure of the using organization and interface with logistics. Knowledge of the level at which specific type actions are taken is essential--entering at either a higher or lower level is a waste of time when the desired result is expeditious action. This implies an awareness of the limitations on the capacity for action initiation at the various levels in those organizations. The time frame for resolution is another important piece of knowledge and with it the ability to alter the normal response time.

The liaison officer is the point man for the field support

function. He has direct contact with the user and contractor field representatives as well as immediate contact with the responsible SPO directorate. His work is an extension of SATAF activities. It is initiated prior to the first aircraft arrival, continues through initial build-up, and is terminated at the end of the "start-up" phase (or succeeding activation if the sites are activated sequentially).

While there is a continuous requirement for the liaison officer at the site, an individual should have a sharply restricted span for any one period. The interactions necessary to achieve the overall objectives of this approach cannot be accomplished at the user activity. A tour of one to two weeks repeated at one month to six week intervals will provide the necessary latitude and keep the required personnel in the function to a minimum.

The field support office must maintain cognizance of the overall performance of the weapon system, to include its support, if it is to fulfill its function. The means available include established data systems, personal contact, contractor reports, and specific information systems developed in response to program requirements.

Regular conferences on field support problems can be established to provide a common forum for all using, supporting, or other participating agencies to air issues. A formal record of the problem description, supporting documentation, completed actions, assigned actions, and designation of an office of prime

responsibility with suspense dates assists in controlling meeting times as well as providing direct feedback to the originating party. Firm agendas must be published with sufficient lead time to allow adequate preparation.

Personal contact with user operations and maintenance personnel can be established and nurtured with relative ease through the preceding activities. It can provide significant benefits to both user and development communities. The greatest value lies in the rapidity with which areas of concern or immediate problems can be disseminated. The speedy resolution of just those situations perceived as minor or insignificant, by the party designated as responsible for resolution can yield valuable benefits by removing irritants that might otherwise cloud, or hide, issues of greater impact. The relationship established in attending these irritants can substantially mitigate obstacles to resolution of more significant problems.

The use of contractor capabilities and resources will greatly enhance the effectiveness of field support. Interim contractor support in areas of deficiency is standard practice. Integrating this effort into field support, obtaining the support of user and support activities, and coordinating the overall effort is the task proposed for field support. Properly done, it can be a major contributing factor in the success of this approach.

SECTION V

SUMMARY

This paper has addressed a broad subject area covering a wide range of activities. Most of the areas are covered in considerably greater detail in other publications so the attempt here was to address selected topics in just enough detail to focus the attention of the reader. The major thrust of the paper is centered on the direction of management attention to the process of getting a weapon system into operational usage in a cost-effective manner. It calls for a reasoned compromise in the imposition of the requirements of certain disciplines, the application of policies in some agencies, and the operating practices of participating organizations. It seeks recognition of the reality of field operations and acceptance of the environment in which those operations occur.

The system is ultimately tested in the field in operational use. It is essential that the system operate in that environment. If changes in field practices can be made to enhance operational capabilities, certainly those changes should be implemented. There is no reason to assume, though, that the environment can be changed to match the one assumed in system design. This is where equipment changes must be made to accomodate the environment and the equipment must be in that environment to determine the changes required. It _is_ more costly to make the changes after the system is deployed but, if they cannot be defined earlier, the sooner they are defined the sooner they can be

corrected.

A determined, well-directed approach to this definition of required changes has been proposed. There is no suggestion to postpone incorporation of known improvements. The proposal is to get the ones that were missed incorporated as soon as possible. A part of this is to extract the necessary information expeditiously and get it into action channels. The contractor and service efforts proposed are to do just that. The effort is short-term and directed at a very specific time frame. It requires extensive planning and a concentrated effort if it is to be successful.

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